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ABSTRACT

This digest begins by defining the concept of hypertext and describing the two types of hypertext--static and dynamic. Three prototype applications are then discussed: (1) Intermedia, a large-scale multimedia system at Brown University; (2) the Perseus Project at Harvard University, which is developing interactive courseware on classical Greek civilization using HyperCard; and (3) Project Jefferson at the University of Southern California, which has developed applications using the Apple Macintosh hardware and HyperCard software. Problems of hypertext systems, such as orientation to the database, cognitive overload, and compatibility, are considered. A few brief hypertext definitions are included. (6 references) (MES)

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HYPERTEXT: BEHIND THE HYPE

by

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Hypertext: Behind the Hype

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What is hypertext?

Hypertext is an organizing principle, like the 15th-century invention of alphabetical order or the Platonic invention of dialectical argument. Ted Nelson, who coined the word in the 1960s, defines "hyper" as "extended, generalized, and multidimensional" (1973). Michael Heim writes, "text derives originally from the Latin word for weaving and for interwoven material, and it comes to have an extraordinary accuracy of meaning in the case of word processing" (1987, p. 160-161).

This image of a multidimensional fabric of knowledge linked with all its intellectual antecedents is one that is familiar to librarians. In a sense, we've been advocates of hypertext all along; encyclopedias, card catalogs, citation indexes, and abstracts all make up this invisible web of knowledge. As librarians, we are used to such organization; in fact, it remains central to our way of teaching others how the library works. However, the electronic hypertext document has few of the built-in frustrations of the paper system.

The essence of hypertext is a dynamic linking of concepts allowing the reader to follow preferences instantaneously and to be in control. The scope of a topic is no longer defined by editor or author and is limited only by the initiative of the reader. As Heim explains, "instead of searching for a footnote or going to find another document referred to, the dynamic footnote, or link, can automatically bring the appended or referenced material to the screen. The referenced material could be a paragraph or an article or an entire book. A return key brings the reader back to the point in the original text where the link symbol appeared" (1987, p. 162). The reader may also choose, however, not to follow diversions, but to continue through a particular document without interruption. It is this interactivity with the database that is the key to hypertext systems; pictures, sound, and text can be instantly retrieved according to the user's needs or whims.

The term "hypertext" is actually a misnomer, as many of the current systems allow and even encourage the inclusion of non-text data such as graphics, animations, and digitized sounds. In the future, the more precise "interactive hypermedia" will probably replace the term hypertext since, in a digital world, sound, text, and images are all represented by the same binary signals, and microcomputers are evolving to take advantage of these new capabilities. Eventually, CD-quality stereo sound and high-resolution video display will be available from the same device—a television, computer, and stereo all in one box.

Currently there are two types of hypertext: static and dynamic (Byers, 1987, p. 250). Static hypertext does not permit changes to the database, but it is interactively browsable. In dynamic hypertext the user may add or subtract data and links. An important aspect of many dynamic hypertext systems is the ability to maintain multiple versions of a document as it changes over time. This allows the writer to track the history of a document and weigh alternative versions simultaneously. In a multi-user environment, this allows the original writer to maintain the first version of a document even after others have changed it.

Current Applications

Prototype applications are under development at several educational institutions. At present, however, these projects are not commercially available except as demonstration packages.

- **Intermedia at Brown**. Hypertext research has been going on at Brown University since the late 1960s. Over the years, many hypertext systems have been developed; since 1985, the Institute for Research in Information and Scholarship (IRIS) has been working on Intermedia, a large-scale multimedia system that currently runs on a network of IBM RT/PCs using the UNIX operating system and Sun workstations that support Sun's Network File System (Yankelovich, Landow, & Cody, 1987, p. 3).

  Two courses—Plant Cell Biology and English Literature from 1700 to the Present—were chosen initially to be part of the project. *Context32, the English Corpus* is the name of the database developed for the English course. It contains biographical sketches of each author under study as well as essays and discussions of styles and techniques. A database of images comprises another category; portraits, photographs, drawings, and reproductions of works of art allow students to juxtapose image and text for the same historical period (Yankelovich et al., 1987, p. 7). Students explore the database for their reading and research assignments, and as part of a final project they are expected to contribute essays, drawings, and links to the database corpus.

- **Harvard's Perseus Project**. The Perseus Project of Harvard University is developing interactive courseware on classical Greek civilization using *HyperCard*. The preliminary database currently includes a historical atlas of the Persian Wars, an archaeological catalog, and texts of Greek tragedies. Plans call for expanding the database to approximately 70 megabytes of text and thousands of images. "This will include almost the entire surviving body of Greek tragedy, comedy and epic; works of major historians such as Herodotus and Thucydides; and substantial portions of the massive surviving works of Plato and Aristotle. There will be color images and measured drawings of museum objects (such as sculpture and Greek vase paintings), plans and pictures of buildings and sites in Greece, and an atlas based on Landsat images. Much of the material commonly studied in courses on classical Greece will be included in the database" (Crane, 1988, p. 51). The required hardware is a Macintosh computer; the software, *HyperCard*.

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- **Project Jefferson at the University of Southern California.** Introduced in the fall of 1987, the Constitutional Notebook is a collaborative effort of the university library, the freshman writing program, and the engineering school at U.S.C. The interface was designed to organize information relating to freshman writing assignments and to build a database online to meet their needs. The program uses the metaphor of an electronic notebook to make this database more accessible to undergraduates. Recently, the Project Jefferson Team released another application, titled the Bali Notebook, that assists anthropologists and biologists in building a simulation model of a Balinese hydrological system. Both of these projects run on Apple Macintosh hardware and *Hypercard* software.

Limitations of Hypertext

As hypertext systems have progressed over the past 20 years, several problems have surfaced. Among the most vexing issues facing hypertext developers are orientation to the database, cognitive overload, and compatibility.

It is feared that readers who are used to finding their way through books with the aid of tables of contents, indexes, footnotes, and marginalia might become lost within hypertext systems. However, new visual cues are integrated into most hypertext systems to lessen feelings of disorientation. As databases grow, navigational tools such as the global map of links and documents and the history of paths taken, though complex themselves, become necessary. And, as hypertext documents develop standards, users will develop "pattern recognition" of those standards, much the same way they do with city bus maps. Over time and use, hypertext will probably change our way of thinking; perhaps, as we learn how to move non-sequentially in texts, the feeling of not knowing where we are will no longer be an issue. Perhaps, too, the notion that one can ever finish a "book" may disappear.

Another criticism of hypertext is that users are presented with so much information that their human circuits burst with cognitive overload. While reading through a document, choices must constantly be made about which links to follow and which to ignore. Following several paths at once may lead to the navigation problem described above. Although this problem is not new with hypertext, computerized access does add a sometimes overwhelming dimension to it.

The issues of standards and compatibility have yet to be addressed. Some may argue that imposing standards while hypertext is still in an experimental stage will dampen creativity, but the reality is that currently we are developing what Van Dam calls "docu-islands" of knowledge that are incompatible with one another. Just when it seems that compatibility problems of microcomputers have eased somewhat, new, more complex hyperdocument systems will make all those interconnections obsolete. It is not too soon to press for standards and compatibility to insure not only connectivity but also ease of use.

Hyperdefs
(Hypertext-related definitions)

- **Hypertext:** Non-sequential computerized text retrieval system that allows users to link associated information into a personal path through the document.
- **Hyperdocument:** A collection of documents in a hypertext system.
- **Hypermedia:** Dynamic linking of "documents" of varying formats— sounds, graphics, video, and text.
- **Global Maps:** Visual cue to all of the links possible in a hypertext document.
- **History of Paths:** A chronological map of choices taken by an individual in a hyperdocument.

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